What is claimed is:

1. A method for determining phase transition pressure of downhole retrograde condensate, the method comprising:

   a) producing a time-series of fluorescence values by measuring fluorescence from a single-phase flow of OBM-contaminated formation fluid in a downhole cell;

   b) producing an OBM-contamination value from the time-series of fluorescence values;

   c) setting pressure in the cell at a transition boundary;

   d) producing an apparent phase transition pressure value by setting apparent phase transition pressure value equal to pressure of fluid in the cell;

   e) producing an OBM-contamination value, and a value of apparent phase transition pressure, for each cycle of a plurality of cycles by repeating steps (a)-(d); and

   f) determining the value of phase transition pressure using apparent phase transition pressure values and OBM-contamination values.

2. A method according to claim 1, wherein producing a time-series of fluorescence values includes measuring fluorescence ratio to produce a time-series of fluorescence ratio values.

3. A method according to claim 1, wherein producing a time-series of fluorescence values includes measuring fluorescence intensity to produce a time-series of fluorescence intensity values.

4. A method according to claim 1, wherein producing a time-series of fluorescence values includes measuring fluorescence spectrum to produce a time-series of fluorescence spectrum values.

5. A method according to claim 1, wherein producing a time-series of fluorescence values includes measuring fluorescence lifetime to produce a time-series of fluorescence lifetime values.

6. A method according to claim 1, wherein producing a time-series of fluorescence values includes establishing single-phase flow in the cell.

7. A method according to claim 6, wherein establishing single-phase flow in the cell includes decreasing drawdown pressure by decreasing rate of flow in the cell.

8. A method according to claim 6, wherein establishing single-phase flow in the cell includes detecting single-phase flow.

9. A method according to claim 8, wherein detecting single-phase flow includes testing for absence of change in fluorescence greater than a predetermined value.

10. A method according to claim 6, wherein establishing single-phase flow in the cell includes detecting multi-phase flow.

11. A method according to claim 10, wherein detecting multi-phase flow includes testing for change in fluorescence greater than a predetermined value.

12. A method according to claim 1, wherein producing a time-series of fluorescence values includes measuring fluorescence at intervals of time in a cell of a spectral analyzer.

13. A method according to claim 1, wherein producing an OBM-contamination value includes curve-fitting the time-series of fluorescence values.

14. A method according to claim 13, wherein curve-fitting the time-series of fluorescence values includes using an OBM-determination asymptotic model.

15. A method according to claim 1, wherein producing an OBM-contamination value includes solving the equation fluorescence ratio (t) = $r_1 + r_2 t^{-x}$, wherein t is time, r_1 and r_2 are constants, exponent x is a decay value, and constants r_1 and r_2 are determined by fitting a time-series of fluorescence values obtained in a second period of time to the equation.

16. A method according to claim 15, wherein x is within the range 0.2 to 0.8, and is approximately 5/12.

17. A method according to claim 15, further comprising validating single-phase flow.

18. A method according to claim 1, wherein producing an OBM-contamination value includes solving the equation fluorescence intensity (t) = $n_1 + n_2 t^{-x}$, wherein t is time, n_1 and n_2 are constants, exponent x is a decay value, and constants n_1 and n_2 are determined by fitting a time-series of fluorescence values obtained in a second period of time to the equation.

19. A method according to claim 1, wherein producing an OBM-contamination value includes solving the equation fluorescence lifetime (t) = $q_1 + q_2 t^{-x}$, wherein t is time, q_1 and q_2 are constants, exponent x is a decay value, and constants q_1 and q_2 are determined by fitting a time-series of fluorescence values obtained in a second period of time to the equation.

20. A method according to claim 1, wherein setting pressure in the cell at a transition boundary includes adjusting drawdown pressure.

21. A method according to claim 1, wherein determining the value of phase transition pressure includes extrapolating a representation of apparent phase transition pressure values versus OBM-contamination values.

22. A method for detecting a phase transition in a flow of retrograde condensate downhole, comprising:

a) moving formation fluid through a phase-segregator and through a downhole cell;

b) illuminating fluid in the cell with fluorescence excitation light to produce a time-series of fluorescence values by measuring fluorescence at intervals of time;

c) comparing a change in fluorescence value with a predetermined value; and

f) recognizing a phase transition when at least one change in fluorescence value is greater than the predetermined value.

23. A method for establishing single-phase flow of retrograde condensate downhole, comprising:

a) moving formation fluid through a phase-segregator and through a downhole cell;

b) illuminating fluid in the cell with fluorescence excitation light;

c) decreasing drawdown pressure;

d) producing a time-series of fluorescence values by measuring fluorescence at intervals of time;

e) testing after each measurement for a phase transition;

f) repeating steps c) - e) until a time-series of fluorescence values indicates no phase transition.

24. A method according to claim 23, wherein testing for a phase transition includes testing for a change in fluorescence greater than a predetermined value.

25. A method for validating single-phase flow of retrograde condensate downhole, and fluorescence measurements on said flow, during a period of time corresponding to a time-series of fluorescence measurements, comprising:

a) moving formation fluid through a phase-segregator and through a downhole cell;

b) illuminating fluid in the cell with fluorescence excitation light to produce a time-series of fluorescence values by measuring fluorescence at intervals of time;

c) testing after each measurement for a phase transition; and

f) validating single-phase flow and fluorescence measurements if every test indicates no phase transition.

26. A method according to claim 25, wherein testing for a phase transition includes testing for a change in fluorescence greater than a predetermined value.

27. A method for establishing multi-phase flow of retrograde condensate downhole, comprising:

a) moving formation fluid through a phase-segregator and through a downhole cell;

b) illuminating fluid in the cell with fluorescence excitation light;

c) increasing drawdown pressure;

d) producing a time-series of fluorescence values by measuring fluorescence at intervals of time;

e) testing after each measurement for a phase transition;

f) repeating steps c) - e) until a time-series of fluorescence values indicates at least one phase transition.

28. A method according to claim 27, wherein testing for a phase transition includes testing for a change in fluorescence greater than a predetermined value.

29. A method for detecting multi-phase flow in a flow of retrograde condensate downhole, comprising:

a) moving formation fluid through a phase-segregator and through a downhole cell;

b) illuminating fluid in the cell with fluorescence excitation light to produce a time-series of fluorescence values by measuring fluorescence at intervals of time;

c) comparing a change in fluorescence value with a predetermined value; and

f) detecting multi-phase flow when at least one change in fluorescence value is greater than the predetermined value.

30. A method for setting pressure in the cell at a transition boundary in a single-phase flow of retrograde condensate downhole, comprising:

a) producing a first time-series of fluorescence values by measuring fluorescence from a flow of OBM-contaminated formation fluid in a downhole cell;

b) validating single-phase flow;

c) increasing a drawdown pressure by a first defined increment;

d) producing a second time-series of fluorescence values from a single-phase flow of OBM-contaminated formation fluid;

e) testing for multi-phase flow;

f) repeating steps c) – e) until multi-phase flow is established;

g) decreasing a drawdown pressure by a second defined increment;

h) producing a third time-series of fluorescence values from a multi-phase flow of OBM-contaminated formation fluid;

i) testing for single-phase flow;

j) repeating steps g) – i) until single-phase flow is established.

31. A method according to claim 30, wherein said second defined increment is smaller than said first defined increment.

32. A method for setting pressure in the cell at a transition boundary in a multi-phase flow of retrograde condensate downhole, comprising:

a) producing a first time-series of fluorescence values by measuring fluorescence from a flow of OBM-contaminated formation fluid in a downhole cell;

b) validating multi-phase flow;

c) decreasing a drawdown pressure by a first defined increment;

d) producing a second time-series of fluorescence values from a multi-phase flow of OBM-contaminated formation fluid;

e) testing for single-phase flow;

f) repeating steps c) – e) until single-phase flow is established;

g) increasing a drawdown pressure by a second defined increment;

h) producing a third time-series of fluorescence values from a single-phase flow of OBM-contaminated formation fluid;

i) testing for multi-phase flow;

j) repeating steps g) – i) until multi-phase flow is established.

33. A method according to claim 32, wherein said second defined increment is smaller than said first defined increment.

34. A method for determining phase transition pressure of downhole retrograde condensate, the method comprising:

a) producing an OBM-contamination value associated with a cycle of time from a time-series of fluorescence values measured on single-phase flow of OBM-contaminated formation fluid in a cell during the cycle of time;

b) producing an apparent phase transition pressure value associated with the cycle of time, after setting pressure in the cell at a transition boundary in the cycle of time;

c) repeating a) and b) to produce OBM-contamination values and apparent phase transition pressure values for several cycles of time; and

d) determining the value of phase transition pressure by extrapolating a representation of apparent phase transition pressure values versus OBM-contamination values.